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Captive Breeding of Orangutans

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With more than 500 orangutans in captivity, the world's zoos have a large available breeding stock. The number of births, and the apparent birth rate, have been increasing. However, no living orangutan is the offspring of captive-born parents. The future of the species in captivity depends on successful propagation of the captive born.

THE ORANGUTAN is a symbolic species for wildlife conservationists and zoo directors. Although protected by law wherever it occurs, it was heavily poached for a time. It was one of the few species whose survival might be threatened by collecting for zoos. Tom and Barbara Harrisson, then in Sarawak, called world attention to the illicit traffic and organized the Orangutan Recovery Service which rescued a number of the animals. Mrs. Harrisson undertook the first experiments to determine whether and how captive orangutans might be reintroduced in the wild.

Before 1966, almost every orangutan acquired by zoos was contraband. They were so freely available that negotiating for legal capture and exportation seemed pointless. Then, at the urging of the International Union for Conservation of Nature and Natural Resources, the American Association of Zoological Parks and Aquariums and the International Union of Directors of Zoological Gardens adopted a ban on undocumented orangutans. Other zoo federations took similar action. Import controls were imposed by several nations, while others tried to regulate transit. A few orangutans were seized by authorities. Dealers found fewer customers for smuggled animals, and a number were blocked in the pipeline.

Before the smuggling trade was curtailed, zoo collections were well-stocked. The first official studbook reported 460 as of December 31, 1969 (Bourne, 1971a). The International Zoo Yearbook Census counted 469 a few months later. Two years later, in 1971, the IZY total was 539, but a large part of this increase was caused by reports from additional collections.

[1] Mrs. Horsemen left the Zoo prior to publication.

According to Crandall (1964), the first orangutan brought to Europe arrived in 1640; America saw its first in 1825. Many of the first imports had short lives. Frederick A. Ulmer, Jr. (1966), writes that a Dutchman, Mynheer van Goens, brought 102 Sumatran orangutans to Europe in 1927 and 1928, of which 33 came to the United States in a single shipment. Most soon died. At the Philadelphia Zoo, whose experience with the species extends over almost a century, the average life of 13 animals exhibited between 1879 and 1930 was three-and-one-half years (Ulmer, 1957).

Many of the early deaths were caused by mishandling from capture to delivery. Young orangutans traveling the smuggling route were often in poor condition on arrival. Zoo men gradually learned how to rehabilitate them, and zoo husbandry improved. While Crandall (1964) judged average longevity to be "still rather low" as recently as 1964, there is no reason now to believe captive life-spans are markedly lower than those of free-living orangutans. Philadelphia's "Guas" (Studbook #467) and "Guarina" (Studbook #468) were each about 50 years of age at the end of 1969.

Until longevity improved, little propagation could be expected; but even when adult pairs were kept together, no success was achieved until 1928. In that year, there were captive births at Berlin, Nuremberg, and Philadelphia. While these babies died in infancy, the barrier had been broken. Philadelphia's second orangutan was born in 1930 and successfully reared (Ulmer, 1966).

Until the 1960s, births occurred now and then, with a fair survival rate, but each success was notable. Then came the rapid increase in zoo collections, and an upward trend began.

The IZY reported six successful births in 1964. There were 19 in 1967, 30 in 1971. The IZY census and the studbook report differ with respect to the 1969 total of living individuals that were captive-born: 81 in the census, 101 in the studbook. In 1971, according to IZY, there were 152 captive-born orangutans. Only 13 percent of those reported in the 1964 census were captive born. There were 28 percent in 1971.

The studbook provided the first data with which to measure breeding potential and results. The first edition gave information on all births occurring in 1967, 1968, and 1969, and on all orangutans reported in collections as of December 31, 1969 (Bourne, 1969).

Captive female orangutans are most likely to bear offspring between the ages of seven and eighteen, although Philadelphia's "Guarina" delivered nine babies between 1929 and 1955, a reproductive period of 26 years (Ulmer, 1966).

During the three years of the studbook reports, 122 females were in the 7 to 18 age group, and 45 of them produced at least one live infant, 37 percent of those eligible. The 45 had a total of 65 successful births, including one set of twins. There is no reliable way to compare propagation in the wild. Barbara Harrisson (1971, private correspondence) notes that present-day orangutan habitats differ greatly in quality, with consequent effects on life spans, propagation, and infant mortality. She believes wild females seldom bear young before nine years of age. Infant mortality tends to be rather high in the wild, ranging around 40 percent. A stable population in a protected habitat would indicate that the average female produces four to five babies, usually between the ages of nine and 30-plus (Harrisson, 1971, private correspondence).

If "Guarina" were typical of captive females, the comparison would be favorable. Of her nine offspring, four were living at the end of 1969. But only two other captive females had this many surviving offspring, and only five had three surviving offspring (Bourne, 1971a). No data is available on the number of deceased offspring.

A rising percentage of captive-born orangutans would seem reassuring. It may not be. If, for example, accessions of wild-caught stock ceased and second-generation births fell short of the replacement rate, the percentage of captive-born individuals would approach 100 percent as the total population approached zero. The wild-caught individuals, being older, would usually die before their progeny.

The number of births has risen from year to year. It is disquieting, however, that no living orangutan is the offspring of two zoo-born parents[1]. Before the studbook appeared, we heard rumors of second-generation and even third-generation births. In part, this may have been misunderstanding. Two correspondents used "second generation" to mean the first zoo-born generation.

Since Philadelphia was the site most named in the rumors, we wrote to Fred Ulmer. His reply: In every Philadelphia orangutan birth, at least one parent was wild-caught. He added as a footnote: "We did have some breeding between 'Pinky' and 'Ivy', who are brother and sister, but the matings always resulted in abortions" (1971, private correspondence).

Has there yet been time for second-generation births to occur? The number of captive-born individuals has increased slowly since 1930. A few captive-born females have given birth, and a few captive-born males have sired young. The studbook does not disclose how many captive-born pairs of breeding age have been kept together.

Of the 122 females of breeding age during the 1967-1969 period, 109 were wild-caught, only 13 zoo-born. Of the 64 females then in the 9 to 11 age classes (the most productive years, according to studbook records), only five were zoo-born. Obviously the potential for second-generation propagation is still low. Further, many zoo men prefer to pair captive-born individuals with wild-caught mates, or they do so simply because captive-born mates are not available. At Philadelphia, for example, "Ivy," born to "Guas" and "Guarina" in 1937, was mated with her father and produced a female baby in 1950.

Still, there is reason for concern, and this will not be eased until a satisfying number of second and third generation births have occurred. Are there problems and challenges to be overcome by management skill?

There is evidence that behaviors such as mating and maternal care are, to some degree, learned by the great apes in their natural settings. While this is more pronounced among gorillas than orangutans, observations in a number of zoos indicate the latter is influenced. A number of zoo-raised male orangutans have, on reaching sexual maturity, responded to the sexual urge in ways more bizarre than appropriate. A number of zoo-raised females have, on giving birth, rejected their infants. Dr. Lang (1971) comments: "Orangs tend to be less affected than gorillas when deprived of social experience with their own kind in infancy, but nevertheless the

[1] A second-generation birth occurred at Rotterdam some years ago, according to Marvin Jones. It died prior to 1967.

number of failures in maternal behavior must give rise to some concern."

When the Wild Animal Propagation Trust was organized in the United States to promote captive breeding of endangered species, the Orangutan Committee was the first named. One of the needs was to bring together unpaired males and females. Thanks to the cooperation of a number of zoos and dealers, this has been reasonably successful. At the time of the 1971 IZY census, only eight U.S.A. collections had one sex only, and seven of these had males, for which no females had been found.

It has also been the experience of some zoos that males and females raised together failed to mate on becoming sexually mature. The National Zoo had such a pair. In cooperation with WAPT, our male was sent to the Cheyenne Mountain Zoo in Colorado, where he sired young; we obtained another male which promptly mated successfully with our female. WAPT has helped to arrange other transfers and deposits.

Such arrangements are not easily made, however. Orangutans are much prized as exhibits, and directors of city-owned zoos are often not free to dispose of valuable animals. Even when a zoo director can subordinate local interests, finding a proper match is often difficult. The IZY census is not current when published, and it does not report the ages of individuals. The studbook provides more data but it has not been issued since 1969. No service provides information on the births, deaths, accessions, and removals that occur from month to month.

Dr. Bourne of the Yerkes Regional Primate Research Center writes (1971b): "I believe the key to sustained breeding is a large group of animals, so that switching of males and females can occur to be sure you can get compatible breeding pairs."

If this is the key to sustained breeding, the present outlook is not favorable. At the time of the 1971 IZY census, the world's largest orangutan collection was at Yerkes, with 28 individuals, plus seven on loan to the nearby Atlanta Zoo. Second largest outside Indonesia, 14 individuals, was at the Cheyenne Mountain Zoo. But the average number in 128 zoos reporting the species was only four. In such small groups, there are sure to be less than the optimum number of compatible adult pairs.

A high proportion of young orangutans are raised in isolation after they are taken from their mothers. Many are taken shortly after birth. Some zoo men are concerned lest the hand-raising of zoo-born orangutans further complicate the breeding problem. Many infants are handled like human babies, associating only with humans in the early months of life. When they are returned to the zoo, it is usually to a lonesome cage, since there are long odds against the zoo having a compatible cage-mate. The managers of some collections advocate hand-raising and, indeed, remove all infants as a matter of course, regardless of whether the mother seems capable of providing care.

The Yerkes laboratory has the advantage Dr. Bourne cites in its number of possible mating combinations. Like most other collections, however, it provides caging for individuals or pairs. In these circumstances, there is little opportunity for the kind of behavioral learning mentioned by Dr. Lang. Only in recent years have ideas or plans been put forward to experiment with groupings of orangutans in large enclosures.

One of the authors collaborated with Barbara Harrisson in designing an experimental enclosure. This called for several open-frame towers, 30 to 40 feet tall, with several platforms, each of which would shade the zone below. Orangutans would be fed in the towers. The hope was that the towers would serve as vertical territories. This design was followed in new construction at the Surabaja and Djakarta zoos (Indonesia). The young orangutans are climbing and brachiating as expected, but the real test will not come until they are sexually mature.

In the United States, some decisions about caging must soon be made, for there is an acute space shortage. Many juvenile orangutans are kept in quarters inadequate for adults, and new construction is lagging behind the needs of this maturing population.

The National Zoo was compelled to dispose of a young pair, through WAPT, for lack of space. In this case, WAPT was able to place them advantageously, but such placements are becoming more difficult.

In summary, it is far from certain that the captive orangutan population will become self-sustaining. The number of births and the birth rate[2] will probably increase for several more years, simply because more wild-caught females will be entering the period of maximum fecundity. In these years, births may exceed deaths, so that the captive population increases. There may be a surplus of orangutans in zoos, as available quarters become crowded.

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[2] Birth rates are unreliable indicators in a population as small and changing as this one. Based on IZY data, captive orangutan births per 1000 population have been:

1964	22	1968	48
1965	26	1969	62
1966	54	1970	64
1967	43	Cumulative average: 48	

This increase can be misleading, however. The future of the captive population depends on births in the second and succeeding captive generations. It is too soon to predict that these will not occur in sufficient numbers, but also too soon to say that they will.

Predictions are likely to be unreliable unless better data is developed for analysts to ponder. It is disturbing that the studbook data is not sufficient. One cannot evaluate second-generation birth results without knowing how many first-generation pairs have been given the opportunity of mating. It would also be valuable to known which captive-born individuals were hand-raised.

Dr. Bourne finds reason for cautious optimism in success with chimpanzees (1971b, private correspondence):

> One of our chimpanzees has five great-grandchildren living at the Center, and another animal has two great-great grandchildren. The last two are the product of two successive captive born matings for sure . . . This is all very good, and although we cannot necessarily extrapolate to orangs, it is encouraging.

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